



Impact of climate change on ozone-related mortality and morbidity in Europe

Author(s): Orru H, andersson C, Ebi KL, Langner J, Astrom C, Forsberg B
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Abstract:

Ozone is a highly oxidative pollutant formed from precursors in the presence of sunlight, associated with respiratory morbidity and mortality. All else being equal, concentrations of ground-level ozone are expected to increase due to climate change. Ozone-related health impacts under a changing climate are projected using emission scenarios, models and epidemiological data. European ozone concentrations are modelled with the model of atmospheric transport and chemistry (MATCH)-RCA3 (50x50 km). Projections from two climate models, ECHAM4 and HadCM3, are applied under greenhouse gas emission scenarios A2 and A1B, respectively. We applied a European-wide exposure-response function to gridded population data and country-specific baseline mortality and morbidity. Comparing the current situation (1990-2009) with the baseline period (1961-1990), the largest increase in ozone-associated mortality and morbidity due to climate change (4-5%) have occurred in Belgium, Ireland, the Netherlands and the UK. Comparing the baseline period and the future periods (2021-2050 and 2041-2060), much larger increases in ozone-related mortality and morbidity are projected for Belgium, France, Spain and Portugal, with the impact being stronger using the climate projection from ECHAM4 (A2). However, in Nordic and Baltic countries the same magnitude of decrease is projected. The current study suggests that projected effects of climate change on ozone concentrations could differentially influence mortality and morbidity across Europe.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES), Other Climate Scenario

Special Report on Emissions Scenarios (SRES) Scenario: SRES A2

Other Climate Scenario: A1B

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution

Air Pollution: Interaction with Temperature, Ozone

Geographic Feature:

Climate Change and Human Health Literature Portal



resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Europe

Health Impact:

specification of health effect or disease related to climate change exposure

Morbidity/Mortality, Respiratory Effect

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : respiratory hospitalizations

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Mitigation

Model/Methodology:

type of model used or methodology development is a focus of resource

Exposure Change Prediction, Outcome Change Prediction

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Long-Term (>50 years)